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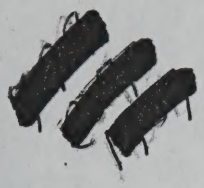

THE NATURAL RESOURCES
OF
CHAMPAIGN COUNTY

Champaign County
Conservation Education Council
Urbana, Illinois

March 1959

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THE NATURAL RESOURCES OF CHAMPAIGN COUNTY

Edited by

DONALD F. HANSEN

CHAMPAIGN COUNTY CONSERVATION EDUCATION COUNCIL

URBANA, ILLINOIS

MARCH 1959

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PREFACE

Nat. Hist. Surv.

It was probably a suggestion made by Marcus S. Goldman at the organizational meeting of the Conservation Education Council in December, 1956, which led the delegates to consider the publication of a booklet on the natural resources of the county. It was felt that such a publication would provide teachers with badly needed teaching material in conservation. My first connection with the project involved preparation of a detailed outline in which each resource was considered from three points of view: (1) What the resource was like (or how much there was of it) when the early settlers arrived, (2) the extent to which it had been used, damaged, wasted, or changed by various kinds of human activity over the past 125 years, and (3) the steps that now might be taken to conserve or build up a resource which has suffered or is likely to suffer in the future.

An editorial committee was appointed to select writers, to read and criticize the completed manuscripts, and to decide on the form of publication. Authors were given copies of the outline but were not required to follow it.

At the suggestion of teachers on the Council, it was decided to first publish the Natural Resources of Champaign County in mimeograph form, so that it might be tested in the classroom, both by teachers and students, before publication of an edition for general use. The Editorial Committee is anxious to receive criticism of the work and suggestions for its improvement from anyone who has a chance to read it. The Council plans to publish the work in the near future as a 6 x 9 inch booklet with photographic illustrations as well as drawings.

It is the hope of the Council that school boards throughout the county will find it possible to adopt this booklet as a sixth grade text or reference, and that each sixth grader will have his own copy. It is believed that this will not only help students become interested in conservation and impress them with its importance but that it will give them a deeper appreciation for their county -- the farmland, the plants and animals, the woods, the prairie remnants, the streams, and the landscape as a whole.

Donald F. Hansen, Editor

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ACKNOWLEDGMENTS

This booklet is a project of the Champaign County Conservation Education Council. In its preparation, many persons have made significant contributions. Among these should be mentioned the authors of the various articles; members of the council who made valuable suggestions; and several teachers, especially Mrs. Marie Miller and Miss Lois Drury of Champaign, who closely followed and helped to guide the project as it developed.

The mimeographing was done in the offices of the Illinois Federation of Sportsmen's Clubs and the Natural History Survey. Maps and figures were furnished by the University of Illinois Department of Agronomy and the Illinois Geological Survey. Other contributions were made by Ernest M. Harshbarger, the County Superintendent of Schools, various departmental offices of the University of Illinois, and the three state scientific Surveys.

Editorial Committee

Donald F. Hansen, Chairman and Editor
James S. Ayars
W. F. Purnell
R. Weldon Larimore

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SOILS OF CHAMPAIGN COUNTY

J. B. Fehrenbacher

Champaign County soils were derived from rock ground up by glacial action. The ground up rock was deposited here as till, outwash, loess, or alluvium. These are the parent materials of our soils. The first three were deposited during glacial times; the last, alluvium, was deposited both during and since glacial times. Glacial till and outwash have been explained in another part of this booklet. It may be mentioned here that glacial till is a mixture of clay, silt, sand, and sometimes pebbles and rocks that was dropped by the glacier and not moved later by flowing water. Outwash, on the other hand, includes similar materials which were carried away from the glacier in melt water and deposited in layers according to the fineness of the material.

Loess, is a silty wind-blown soil material which was deposited over much of the state, in some places to a depth of 25 or more feet. When finely ground rock material was carried away from the glaciers in their melt waters, some of it was deposited in the form of mud on the flood-plains along the Illinois and Mississippi rivers. These deposits were laid down in the summer when most of the melting of the glaciers occurred. In the winter months when the glaciers stopped melting and river levels dropped, the flood-plains became dry mud flats. Then strong winds picked up the dry powdery material and carried it out over the state in great dust storms, and dropped it on the land. During the time in which the glaciers were present in Illinois, this wind blown loess, mostly from the Illinois River flood-plain, was deposited over Champaign County to a depth of 3 to 5 feet on the flatter land; and to a depth of 2 feet or less on the sloping land, particularly in the northeast part of the county. Loess is one of the most extensive soil parent materials in Champaign County.

Alluvium is any soil material that is washed from higher ground and deposited by streams on their flood-plains during floods. Any time a stream overflows its banks, some alluvium in the form of sand, silt, and clay is deposited on its flood-plain to form bottomland soils.

The original texture and chemical makeup of soil parent materials help determine the kinds of soils formed. Sandy parent material produces sandy soils, whereas clay deposits give rise to fine-textured soils that are hard to work and often difficult to drain. Parent materials which are low in nutrients or plant foods cannot give rise to fertile soils.

In the thousands of years since the glaciers retreated the soil materials deposited during glacial times have been greatly changed by what are referred to as "soil forming" or "soil development" processes. These processes are of two main types, (1) weathering and (2) the addition of organic matter to the soil, mainly due to the growth of plants, but partly due to the presence of animals.

Weathering includes the various effects of water and temperature on the soil. We refer here not only to alternate freezing and thawing, wetting and drying but also to other, even more important effects on soil, such as solution or dissolving by water of chemical substances from the soil, hydration or the combining of water with chemical materials, and percolation of water through the soil. An important effect of percolation is to concentrate to some extent the finer soil material, the clay, into a layer or zone a foot or two below the surface.

Topography and permeability of the soil influence the amount of water that enters the soil, and these factors have an important effect on the speed of weathering; they control, to some extent, the color, texture, structure, and amount of chemical breakdown of minerals in soils caused by the action of water and temperature on the soil material. In general, soils formed under poor natural drainage conditions (soils that are slow to dry out properly) have

gray subsoils (see discussion of subsoils below). Some of these soils were formed on swamp land that was wet the year round. Often these soils require additional drainage by field tile or open ditches before good yields of common farm crops can be produced. Soils formed under good natural drainage conditions, i.e. on sloping land, or where the soil is derived from coarse materials have yellowish-brown subsoils and do not require tiling or ditching. When the county was first settled such soils dried out quickly and were never covered with water for any length of time. In farming these soils they frequently need erosion control and water conservation measures in order to produce good yields. Intermediate between the poorly drained and well drained soils are the imperfectly drained soils with mixed or mottled gray and yellowish-brown subsoils. Some of these soils were formed where water stood on the surface in the spring but where the water dried up in summer. But many imperfectly drained soils are formed on gentle slopes and may require drainage systems as well as certain erosion control measures.

The climatic factors, quantity of rainfall and temperature, affect the kind and amount of weathering that takes place in soil development. But in an area as small as Champaign County, the climate is much the same and does not cause any particular differences in our soils.

Whether the original vegetation covering the land was forest or prairie was of great importance in the development of Champaign County soils. Most of the county had a prairie or grassland vegetation at the time of settlement. The prairie grasses, because of their extensive and deep root systems, added large amounts of organic matter to the soils each year (in the form of dead roots), and these additions are responsible for the dark color of our prairie surface soils. On some of the better drained, hilly land, particularly near the larger streams of the county, trees had grown for some time before the first settlers came. The trees added less organic matter to soils than did the grasses because the roots of trees live year after year and the greater part of

the leaves and dead branches more or less completely decompose on the surface and so are not added to the soil. Consequently, soils formed under forest are somewhat lighter colored and usually have thinner topsoils than those formed under grass vegetation.

During their development, soils pass through several stages which might be compared to infancy, youth, and old age in man. These stages of development depend on the amount of weathering that has taken place. Before much weathering of the parent material has occurred and little nitrogen has accumulated soils are quite unproductive. Later, after a good supply of organic matter has accumulated and plant nutrients have become easily available, soils reach peak productivity. Finally with continued weathering soils become acid, lose some of their organic matter and plant nutrients through leaching, and become less permeable to air and water. At this stage they are again relatively unproductive. Since weathering takes place faster in some soils than in others, soils of the same age are not necessarily at the same stage of development.

Most of the soils of Champaign County are in the intermediate, or productive stage of development. When this area was first settled, the soils were among the most productive in the world. While the development process described above is hastened to some extent by cultivation of the land and production of farm crops, this is not a matter for great concern so long as good farming methods are used. These good farming methods include keeping up the supply of nutrients through fertilization, the replacement of some of the organic matter by use of crop rotations and crop residues, and the control of erosion. Most Champaign County soils which have declined in productivity through 75 to 100 years of hard, exhaustive farming and poor management can be restored to their original high productivity, and, in many cases can be made even more productive by adopting good soil management methods. The decline in soil productivity, followed by its restoration, and the capacity for high

productivity over a long period of years when well managed are very well demonstrated on Flanagan silt loam on the Morrow Plots, located north of Mumford Hall on the University of Illinois campus.

It is due to the effect of climate (moisture and temperature) on the soil and the growth of plants during many years that a soil develops a profile with different layers from top to bottom. These layers are best seen on the side of a ditch, a high embankment, or excavation for a building. Although the farmer works only the upper 6 or 8 inches of soil, all of the soil to a depth of 3 to 4 feet is important to him because plants get some food and particularly water from deeper soil layers (especially in dry weather) as well as from the surface layer.

The soil profile has three main layers, the topsoil, and subsoil, and the underlying material. These layers are also called soil horizons because they tend to lie parallel to the earth's horizon. Each layer has certain distinct properties.

The topsoil or surface soil is darker colored than the lower layers because it contains the most organic matter. In most of Champaign County the topsoil is 12 to 18 inches in thickness except on eroded areas. It is in this layer that plants have most of their roots and where they get most of their food. The topsoil, because it contains more organic matter than the lower layers, supplies most of the soil nitrogen to plants. Topsoils differ from one another in texture, which means that they vary in their content of sand, silt, and clay. Sandy soils are coarser textured than clay soils and usually are easier to cultivate. Silty soils are generally intermediate between sandy and clay soils in ease of cultivation. The clay soils require more power (often larger tractors) for plowing and cultivating than do sandy soils and are usually more difficult to work down into good seedbeds.

Because crop yields decline considerably when topsoil is lost by erosion, and because it is very difficult to make good topsoil out of subsoil,

conservation measures and farming practices in general should preserve this important soil horizon.

The subsoil occurs just below the topsoil, except in those areas where the original topsoil has been entirely eroded away. The subsoil in most of Champaign County begins 12 to 18 inches below the ground surface and extends to depths of 30 to 40 inches. In other words, Champaign County subsoils are usually 2 to 3 feet thick. The subsoil is generally lighter colored than the topsoil. It tends to be gray, yellow, or brown. Usually the subsoil contains more clay than the topsoil above or the underlying material. This is because part of the clay that was originally present in the topsoil has been carried downward by the percolation of water, and has become somewhat concentrated in the subsoil layer. An important quality of a desirable or good subsoil is that it allows water and air to move up and down with moderate ease. Good subsoils which allow excess water to drain away into tile drainage systems or into the deep underground layers--and yet hold a good supply of water in reserve for the use of plants in dry periods are classed as moderately permeable. Most of the soils of Champaign County have this characteristic. However, some subsoils contain more clay than is desirable. In these subsoils water and air move too slowly, and roots penetrate them with difficulty. They are classed as slowly permeable subsoils. A few Champaign County subsoils are rapidly permeable; these contain too much sand and not enough clay to hold very much water in reserve. These soils are said to be "drouthy" in summers of low rainfall. The subsoil not only serves as a reservoir for water but it also holds large reserves of such plant nutrients as phosphorus, potassium, and calcium.

The underlying material is directly below the subsoil. The underlying material may be slightly weathered or unweathered material from which the subsoil and topsoil were derived--most often loess, in this county. However, when the loess deposit is thin, the underlying material is usually some other kind of deposit--commonly glacial till. Where all three layers are formed from the

same material, the underlying material has not usually been changed as much as the topsoil and subsoil because processes of soil formation have usually been most active near the surface.

On the basis of differences in color, texture, structure, permeability, natural drainage, chemical composition, and thickness and arrangement of the various soil horizons, many soil types have been recognized and have been given type names. A soil type name includes a proper name (usually the name of a town) plus terms describing its surface soil or topsoil texture--Saybrook silt loam, Flanagan silt loam.

In the following paragraphs are given some of the important characteristics of the main soil types in various soil groups in Champaign County. The location and extent of the six soil groups in the county are shown in Fig. 1. The groups are based on the kind and texture of the parent materials in each area, and the kind of native vegetation (whether prairie or forest) under which the soils were formed. Within each group, the soil types vary in their characteristics because of differences in the natural drainage conditions under which they developed, that is, some were poorly drained, others imperfectly drained, and some well drained. The crop yields for these soil groups are in terms of bushels of grain and tons of hay produced per acre annually. These are average yields, not maximum yields. The average crop yields given here for the various soils are not particularly high. With continued research on soils and crops and more intensive application of good management and conservation practices, it is expected that average yields will be considerably higher in the future than they are today.

Soil Group 1.--In this group the main soil types are Drummer silty clay loam, a naturally poorly drained soil, Flanagan silt loam, an imperfectly drained soil, and Catlin silt loam, a naturally well drained soil. All were formed under prairie vegetation from silty loess parent material varying in thickness from about 3 to 5 feet. They all are dark colored. These soils are

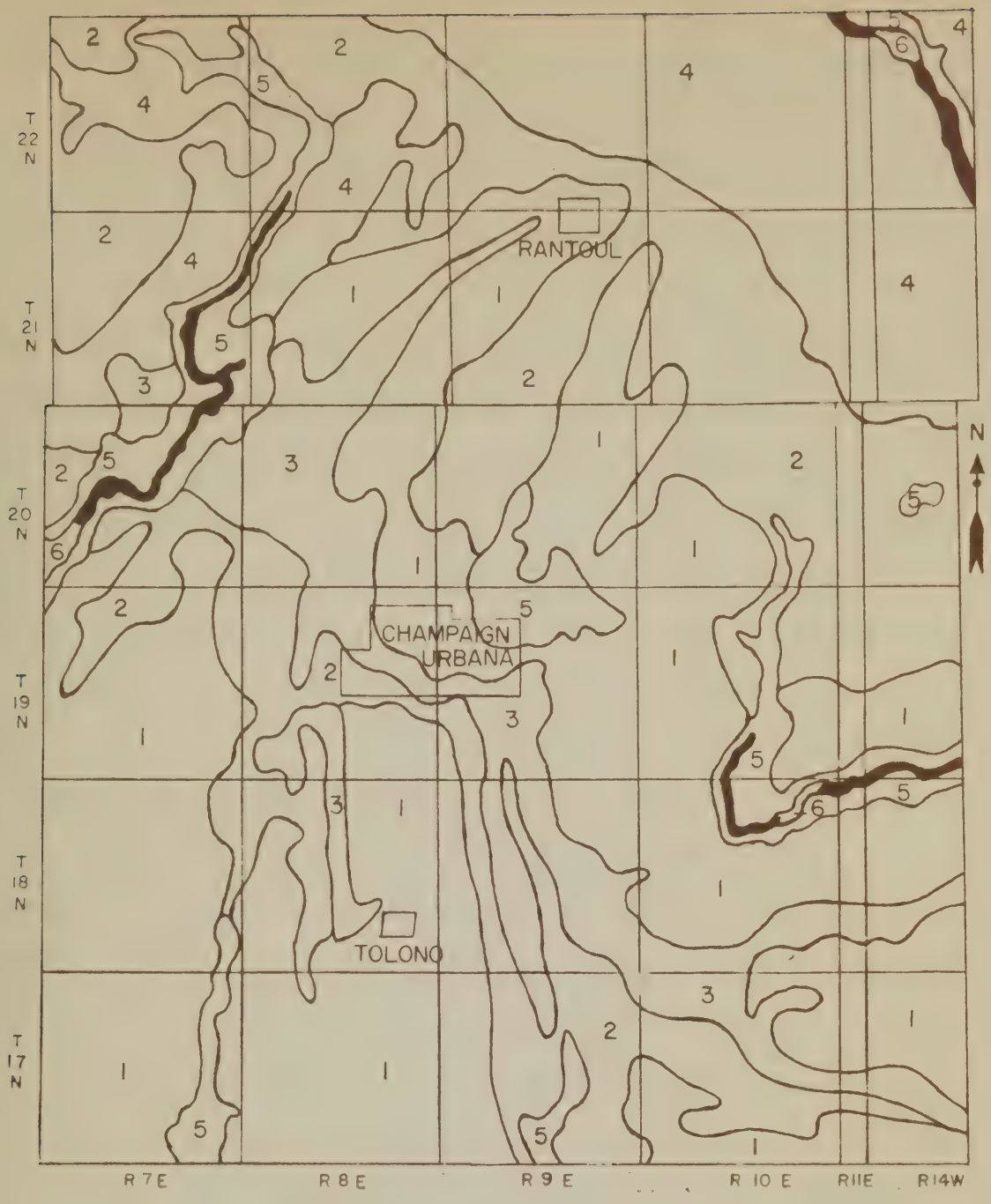

FIG. 1 - SOIL GROUP MAP OF CHAMPAIGN COUNTY, ILLINOIS AND MAIN SOIL TYPES IN EACH GROUP

1 — SILTY LOESS, PRAIRIE SOILS — DRUMMER, FLANAGAN, CATLIN

2 — SILTY OUTWASH, PRAIRIE SOILS - DRUMMER, BRENTON, PROCTOR

3 — LOAM TILL, PRAIRIE SOILS — SAYBROOK, SIDELL

4 — SILTY CLAY LOAM AND SILTY CLAY TILL, PRAIRIE SOILS — ASHKUM, ELLIOTT, SWYGERT

5 — LOESS, OUTWASH, AND TILL, FOREST SOILS — BIRKBECK, CAMDEN, MIAMI, BLOUNT

6 — ALLUVIAL, BOTTOMLAND SOILS — SAWMILL, HUNTSVILLE

TOWNSHIP LINE TOWN

SCALE IN MILES

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most extensive in the southern half of Champaign County. Drummer occurs on flats and requires drainage. It is permeable and most areas are readily drained by tile. The more level areas of Flanagan often need some tile drainage, whereas the more sloping areas need some erosion control measures such as contour farming. Catlin usually occurs on moderately sloping areas. It does not require drainage, but should be farmed with adequate erosion control measures to prevent the loss of valuable topsoil. This group of soils when well managed, including the use of limestone and fertilizers, is probably the most productive group in the county. Under good management these three soils should average about 80 bushels of corn, 32 bushels of soybeans, 57 bushels of oats, 28 bushels of wheat, and about 3.1 tons of alfalfa hay per acre.

Soil Group 2.--Drummer silty clay loam, Brenton silt loam, and Proctor silt loam are the main soil types in soil group 2. The Drummer of group 2 is practically the same as the Drummer of group 1, except that in group 2 it usually has mixed sandy material underlying it because group 2 soils have outwash as their main parent materials. The outwash plains and stream terraces on which group 2 soils are found usually have some silty loess and/or silty wash in the upper part of their profiles and sandy material in the lower part. Soils in this group were formed under prairie vegetation and are dark colored. Brenton is naturally imperfectly drained. It sometimes needs additional drainage, but it seldom needs much in the way of erosion control. Proctor, a naturally well drained soil, does not need drainage, but does need conservation measures and good farming to keep it productive. Under good management the three soils of group 2 should average about 78 bushels of corn, 31 bushels of soybeans, 57 bushels of oats, 28 bushels of wheat, and about 3 tons of alfalfa hay per acre.

Soil Group 3.--Saybrook silt loam and Sidell silt loam are the main soil types in this group. Both are dark colored, naturally well drained soils developed on sloping land under prairie vegetation from glacial till of loam

texture. The underlying material of Sidell is somewhat more permeable than that of Saybrook and because of this, Sidell is leached and weathered more deeply than Saybrook. Neither of these soils needs tiling; both require erosion control measures. Unless these soils have been carefully farmed, they usually have lost considerable amounts of topsoil. Under good management these two soils should average about 75 bushels of corn, 29 bushels of soybeans, 57 bushels of oats, 29 bushels of wheat, and about 3 tons of alfalfa hay per acre.

Soil Group 4.--The main soil types in soil group 4 are Ashkum silty clay loam, Elliott silt loam, and Swygert silt loam. All of these soils have formed under prairie vegetation and are dark colored. Ashkum and Elliott developed from glacial till of silty clay loam texture; Swygert developed from till of silty clay texture. Ashkum is naturally poorly drained and in appearance resembles Drummer, but Ashkum is heavier textured, somewhat harder to work, and is drained slowly by field tile. Elliott is naturally imperfectly drained. Like the Ashkum, Elliott can be drained slowly by field tile. Erosion control measures are often needed on Elliott. Swygert is also naturally imperfectly drained. It was formed from fine textured, silty clay, till which does not permit it to drain freely. Tile drainage is seldom effective. Because Swygert usually occurs on rolling or moderately sloping land and has slow permeability, serious erosion is common unless soil conservation practices are followed. Under good management the soils in this group should average about 68 bushels of corn, 28 bushels of soybeans, 52 bushels of oats, 28 bushels of wheat, and 2.7 tons of alfalfa hay per acre.

Soil Group 5.--Birkbeck, Camden, Miami, and Blount silt loams are the main soil types in soil group 5. All of these soils have formed under forest vegetation and are light colored. Birkbeck, Camden, and Miami are naturally well drained; Blount is naturally imperfectly drained. The main differences between these four soils are due to differences in their parent materials. Birkbeck is derived from silty loess, as are the soils in group 1. The parent

material of Camden was outwash sediments--the same as those of group 2 soils. Miami was formed from glacial till of loam texture, as were the soils of group 3, and Blount developed from silty clay loam till, the same as Ashkum and Elliott of group 4.

These four forest soils usually require more lime and fertilizer than equivalent prairie soils. In general, they are not quite so productive as their prairie counterparts. Camden sometimes occurs on nearly level areas, but the other three are usually found on sloping areas. All four soils need good management and careful attention to erosion control measures in order to produce good crop yields. Under good management these four soils should average about 61 bushels of corn, 25 bushels of soybeans, 46 bushels of oats, 25 bushels of wheat, and 2.6 tons of alfalfa hay per acre per year. Blount is probably the least productive and Birkbeck the most productive of this group.

Soil Group 6.--Sawmill silty clay loam and Huntsville loam are the main alluvial or bottomland soils in group 6. These soils are not extensive in Champaign County; they occur in the bottomlands of the Sangamon River and the North Fork and Salt Fork of the Vermilion River. Both soils are dark colored. Sawmill is naturally poorly drained and moderately fine textured, whereas Huntsville is naturally well drained and medium textured. Unless they are protected by levees, both soils are subject to some flooding. Because of occasional flood damage, average crop yields are somewhat lower than yields on the upland soils. Crop yields should average about 59 bushels of corn, 23 bushels of soybeans, 42 bushels of oats, 23 bushels of wheat, and 2.6 tons of alfalfa hay per acre.

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FARMING AND SOIL CONSERVATION

W. F. Purnell

In the more than 100 years of farming in Champaign County there have been great changes in farming methods and in farm life itself.

From the first there were a few very large livestock farms in the county, but most farms in the early days were smaller than the farms are now. In the old days small farms of 80 to 100 acres were common. In fact these acreages were about as much land as most farmers could use. Before World War I farmers raised much of their own food--they had vegetable gardens, berry patches, and orchards, and they raised cattle, hogs, chickens, and other fowl. Many families "traded" butter and eggs at the local stores for the food items which they were unable to produce at home.

Some of the earliest settlers used oxen for plowing and cultivating, but horses soon displaced oxen, and after World War I tractors rapidly took over the work that had been done by horses. The tractor, which did the work much faster than horses, made it possible for one man to farm more land. Farms therefore were consolidated (through one farmer buying or renting all or part of another farm from one or more of his neighbors) until, today, farms average more than 200 acres in size. There are, of course, fewer farmers now. The remains of farm home sites still may be seen scattered over the county and demonstrate that fewer houses are needed. Often a patch of overgrown grass and a few tall trees mark the location of an abandoned home site.

Following the introduction of the tractor other farm machines were put into use which have further speeded up farming operations--the 4-row cultivator, the combine harvester, and the corn picker. Efficient operation of larger farms has made possible better individual farm incomes, farmers now have about the

same luxuries as city people. Farmers have become less and less interested in raising fruits, vegetables, and livestock for the family food supply.

In Champaign County, the employment of chemical fertilizers on a large scale began around 1945. Soil testing laboratories established after 1950 determine the kinds and amounts of fertilizing materials which are needed on any field. These laboratories operate under the guidance of the University Soil Testing Laboratory.

In the period 1940 to 1958, the increased use of fertilizer and hybrid corn, with improved tillage practices, has probably increased average corn yields in the county by 20 to 30 bushels per acre.

The major farm activity on Champaign County farms is the production of grain--mainly corn and soybeans. A relatively small number of farmers raise hogs, sheep, dairy or beef cattle. According to the 1955 census, out of a total of 596,000 acres of farmland in the county there were 227,000 acres of corn, 157,000 acres of soybeans, 70,000 acres of oats, and 32,000 acres of wheat.

Probably because crop yields are generally high and there are seldom crop failures due to storms, drouth, etc. Champaign County has attracted investors in land. As a result of competition for the purchase of land, especially by well-to-do city people, land prices in Champaign County are among the highest in the Middle West. It is now almost impossible for the young farmer to buy good land in the county unless he, too, is financially well off. In 1958, about 80 percent of the land was operated by tenants rather than the owners. Tenant farming is often highly profitable for the tenants, provided they are good farmers and operate a large acreage of good land.

Soil Conservation

In the 1930's the U. S. Government recognized that the loss of productive topsoil through erosion was a serious threat to the future of American agriculture. Federal and state workers had found that in some hilly parts of the

United States, all of the original topsoil had been eroded away and that on nearly all sloping land, substantial amounts had been lost. The U. S. Soil Conservation Service was set up to show farmers that profitable farming could be carried on without excessive soil loss.

We are most concerned in Champaign County with what is termed sheet erosion. This is the washing away of a thin layer of topsoil with every hard rain. Before Champaign County land was farmed, there was almost no erosion because the soil was protected by prairie grasses or by the thick stands of timber. But, when the prairie and the woodlands were put under cultivation, the soil was exposed and the beating action of raindrops, along with plowing, harrowing, and cultivating tended to break down the granular character of the soil. Gradually the soil became more compact; it absorbed less water and, with more water running off the surface, more erosion took place.

It is difficult to estimate the average amount of erosion that has occurred in Champaign County. Most flat areas show little soil loss, but much of the land which we call flat is actually sloping enough to erode. Many of the slopes are long, and erosion on long slopes is more severe than on short ones. Furthermore, fields planted to row crops, like corn and soybeans, erode much faster than pastures and hayfields. Although in a few places the topsoil has been entirely lost on most land in this county more than half the topsoil is still present. Here and there, poor soil eroded from a hillside has been deposited over good soil on adjoining flat land.

Gully erosion is not generally a serious problem in Champaign County. However, gullies sometimes develop where runoff water concentrates in the natural drainage ways, unless these are protected by permanent grasses. Subsoil erodes more rapidly than topsoil and gullies are found most often where the topsoil is gone or is quite thin.

The most important damage from erosion is the loss of the topsoil. As the topsoil is lost, crop yields decline. This soil layer contains the greatest concentration of the important plant nutrients and organic matter; it has greater ability to absorb water, and as previously mentioned it is more resistant to erosion than the subsoil.

The topsoil carried down the slopes by erosion may become a problem somewhere else. It may cause the filling of farm ponds, of roadside ditches, and drainage ditches. When eroded soil is carried down rivers the water-born soil, or silt, often causes the gradual filling of lakes and city reservoirs. In a period of only 20 years, soil from Champaign and other counties which was washed into the Sangamon River and then into Lake Decatur resulted in the loss of one-third of the original water storage capacity of that lake.

Although erosion control methods are now well understood, many farm owners and tenants are reluctant to put these methods into practice. Many owners have failed to recognize that uncontrolled erosion, proceeding at even a moderate rate, has seriously reduced the capacity of land to raise good crops. On many other farms, in spite of erosion, farmers have maintained yields through various improvements in methods of farming, such as use of higher yielding crop varieties larger amounts of fertilizers, and the use of improved tillage machinery.

Many farmers find it hard to believe that a soil conservation program can result in an immediate increase in the profits from their farms. Some feel that a soil conservation program is a luxury, that they cannot afford. But a study made by the United States Department of Agriculture and the University of Illincis farms operated under soil conservation programs gave an average increase in net profite of $1,000 a year for each 160 acres of land. This $1,000 a year was the additional profit after any expenses of installing the conservation program had been paid. A conservation program, therefore, is not a luxury in any sense, but a profitable investment.

Now, some of the soil and moisture conservation methods suitable to farm land in this county may be pointed out. Cropping systems, including proper use of fertilizer, are needed which will keep the soil covered by green vegetation and protected from beating of raindrops during the growing season, and partly covered by corn stalks or straw through the winter. The more luxuriant the growth, the greater the quantity of plant fiber produced, and the better the soil protection will be throughout the year.

Much of the cropland in the county needs to be farmed on the contour; that is, plowing, planting, and cultivating operations should be across instead of up and down the slopes. When contoured rows are cultivated, the ridges of soil thrown up by the cultivator form miniature dams. Thus water is held in the furrows by these dams so that it has more time to sink into the ground. Later this water will be available for the plants.

Where slopes are fairly long and uniform, terracing and strip cropping, on the contour, can be used effectively. In strip cropping, strips of cultivated crops, such as corn are planted between strips of closely seeded crops, such as oats or alfalfa. During heavy rains the closely seeded crop slows down the running water and this allows part of the soil to settle out that has been eroded from the cultivated strip. However, since most farmers in this county do not raise livestock and are not very interested in raising hay and small grains they greatly favor terracing over strip cropping on long slopes. In this county terracing is perhaps even more effective than strip cropping as a soil saving measure.

Terraces are low, nearly flat ridges, each with a water channel constructed across the slope. They are used to break a long slope into a series of short ones. Terraces are usually constructed with a very slight grade so that water can flow slowly across the slope to a prepared outlet which is covered by a grass sod.

All channels which carry surplus water from a field should be covered with dense grass sod. These grass waterways are never plowed. Where a grass waterway empties into an open ditch at a lower level, a structure, usually of concrete is installed to prevent the formation of a gully.

Farmers can get assistance with their soil conservation problems through a number of sources. The Champaign County farm adviser is the county representative of the Agricultural Extension Service of the University of Illinois. He is available for consultation and assistance on all types of farm problems.

The Champaign County Soil Conservation District carries on a program of soil conservation designed to maintain and improve the soil resources of the county. The Soil Conservation Service of the United States Department of Agriculture provides technicians who assist the district to carry out its program. Farmers may apply to the Soil Conservation District board for assistance with their soil and water conservation problems. Assistance usually includes help with the preparation of a farm conservation plan designed to make the most efficient use of the soil resources on each farm. A map of the farm is prepared which shows the different soil types, the degree of slope on each field, and the amount of topsoil present. The technician then helps the farmer to decide on the best use to be made of each kind of land on the farm; they help him select a suitable crop rotation and recommend the soil and water conservation practices needed on each field.

Cash payments are available to farmers to help them apply certain approved practices under the U. S. Agricultural Stabilization and Conservation Program. The Farmers' Home Administration makes loans to farmers to help them install soil conservation practices.

Records show that in 1958 about one-third of the farmers in Champaign County were participating in some kind of a soil conservation program. Why aren't more farmers taking part in the program? Probably the most important

reason is that farming in Champaign County has been very profitable, and farmers, for the reasons outlined above, have not yet been able to see the need for soil conservation methods; the old methods of farming still seem good enough. Many farmers that should be using soil conservation methods do not yet feel that they have an obligation to save the land for future generations of farmers.

WFP:jp
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SAND AND GRAVEL

George M. Wilson
J. E. Lamar

Many thousands of years ago the last of three great sheets of glacial ice spread southward from Canada and covered Champaign County as well as other parts of Illinois and adjacent states. During the last stage of glaciation, specifically named the Wisconsin, the ice may well have been several thousand feet thick, and it left evidence of at least 30 readvances in Illinois.

The Wisconsin glacier advanced across Illinois, in a southwesterly direction as far as Shelbyville. Embedded in the ice were boulders, pebbles, sand, silt and clay that the glacier had picked up in the areas to the north over which it had passed. Part of this material had been deposited along the way by earlier ice sheets; part of it was picked up from rock outcrops. With the melting of the glacier, the sand and gravel became separated out and were deposited in Champaign County. Such deposits of sand and gravel are typical of glaciated regions.

It is necessary to know several things about the Wisconsin glacial stage and its various advances or sub-stages. Although the ice was moving forward most of the time, the ice at the front of the glacier was melting most of the time. When the ice melted away as fast as the glacier moved forward, the front of the glacier remained almost stationery. However, at certain periods, as a result of the melting combined with the forward movement of the ice, the front of the ice moved back and forth over a few thousand feet or a few miles. At such times, the clay, silt, sand, pebbles, and other rock materials freed from the ice were deposited and so built up a series of ridges called a

terminal moraine. The terminal moraines occurring in Champaign County are low hilly ridges with gentle slopes. They are known as the Cerro Gordo, West Ridge, Champaign, Urbana, Bloomington, and the Chatsworth moraines (Fig. 2). Similar moraines are to be found scattered over the northeast quarter of the state. All were formed during the Wisconsin stage of glaciation.

As the river of meltwater (the water from the melting glacier) flowed away from the moraines it carried with it an exceedingly heavy load of the clay, sand, pebbles, and cobbles. But this load of rock material was too heavy to be carried very far by the water. The water gradually dropped its burden as it flowed away from the ice front. Usually the heaviest and the largest pebbles were dropped first, then smaller pebbles, then sand, then silt and then clay. As the sorting was not perfect, there was some mixing of materials of similar size. The sorting action of the water as it moved away from the glacier thus was responsible for the deposits of sand and gravel in Champaign County. The rounded shape of the individual pebbles in gravel is the result of the rock pieces having been rolled over one another when they were carried away from the glacier in fast moving streams.

In some places apron-like deposits of considerable area, called outwash plains, were built up in front of our Champaign County moraines. A fine example of an outwash plain is the low flat ground which lies south of Route 150 and which extends for several miles between the west edge of Champaign and Mahomet. Other outwash plains lie west of the West Ridge moraine in the southwestern part of the County and along an area of considerable expanse in the northeastern part of the County in front of the Bloomington morainic complex. Some of our gravel deposits are found in these outwash plains.

In places the glacial meltwaters concentrated in stream valleys such as those of the Sangamon River, the Middle Fork, and the Salt Fork and left deposits of sand and gravel at certain points along their courses. These are called valley train deposits. Many of these deposits have been eroded away since glacial times and only small remnants are to be found in the bottoms of present streams.

Sand and gravel has been dug from valley train deposits along the Sangamon River near Fisher and Mahomet, along the Middle Fork of the Vermilion River in the northeast corner of the county near Penfield, and close to the west branch of the Salt Fork, south of Brownfield Woods. Much of the gravel now dug in the county comes from valley train deposits in the Mahomet area. These valley train deposits or terraced deposits, which frequently occur some distance away from the present streams but in the stream valley were, of course, deposited when the streams were much larger than they are today.

Many sand and gravel deposits do not show at the surface of the ground because they are covered with soil or have undergone considerable mechanical decomposition at the surface (grinding of pebbles and boulders against other pebbles and boulders). By determining where the glaciers built their moraines, and by knowing the shape and characteristics of sand and gravel deposits, geologists can map out those areas where sand and gravel are most likely to occur. This has been done in part of Champaign County. At some places records of water well drilling and digging also give valuable information about the location and size of such deposits. The sand and gravel resources of the county will not be fully known until all of the likely areas have been more completely explored by test drilling or digging.

Like coal, oil, and other minerals, sand and gravel deposits are not limitless. If we continue to dig sand and gravel in Champaign County there will come a time, years hence, when the deposits will be used up. We shall then have to turn to other areas for our sand and gravel. When this will be we cannot now guess because the total quantity of this resource is still to be determined. Even if such figures were available there would always be a question as to whether to use the sand and gravel now as we need it, or to save it for the future!

The digging of sand and gravel usually leaves an excavation or pit and also piles of earth that were stripped away to uncover the sand and gravel deposit. Such pits and piles of earth (called spoil piles) eliminate relatively small land areas from their normal uses. A side benefit of sand and gravel digging is the creation of water-filled pits which often are left in the ground and afterward are used for recreational purposes. Kaufman's Clear Lake, near Kenwood, and several small ponds near Mahomet, including the pond at Camp Kiwanis originated in this way.

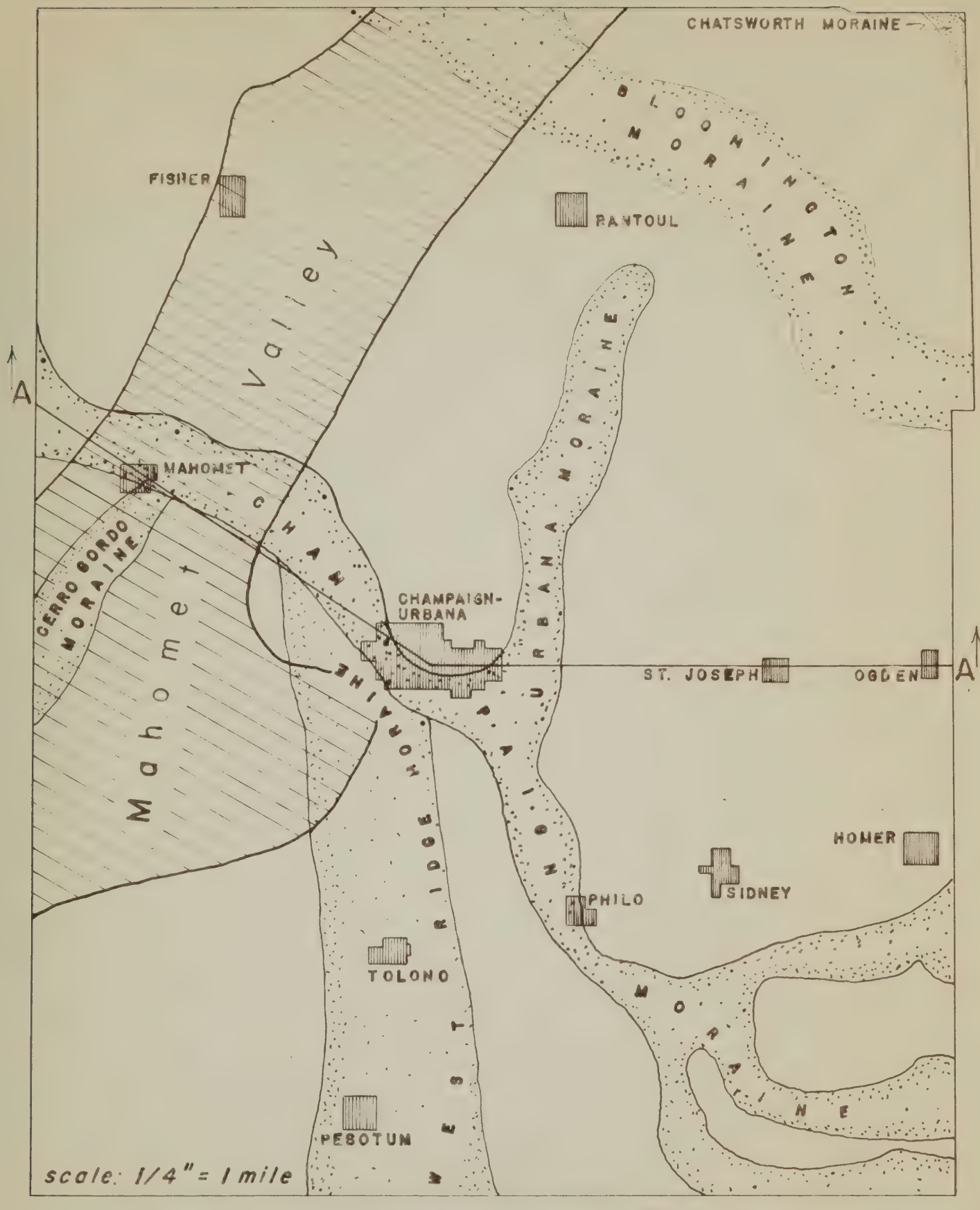
Ground Water

George B. Maxey
Harmon F. Smith

For an understanding of the ground water of Champaign County something must be known about the rock materials that underlie the county, because this water moves through and is eventually stored in these materials.

Two hundred to three hundred feet below the surface are the solid rock layers deposited in ancient seas. Above the layers of solid rock are the materials deposited by the glaciers--sand, gravel, silt, and clay. In their southward, or southwestward movement across Canada, and Northern United States the glaciers carried with them immense quantities of rock debris. When the ice sheets melted they deposited an irregular blanket of this material that we now find above the bedrock layer in the county. The thickness of these deposits varies because they were laid down on a hilly surface of solid rock into which large river valleys had earlier been cut. The thickest of the glacial deposits, including those containing the most sand and gravel, occur in the buried valleys such as the ancient Mahomet River Valley (see map and profile), Figs. 2 and 3, which cuts across the northwest part of the county.

Of the three major ice sheets known to have entered the county, the first was here more than 200,000 years ago. Each glacial period was followed by a long period of warm climate when the ice melted back. The last ice melted from Champaign County about 18,000 years ago. The advancing and melting back of the ice sheets greatly modified the surface drainage of the county. The valley of Mahomet River was gradually filled with



Champaign County Moraines and Mahomet River Valley

BEDROCK VALLEY

MORAINE

FIG. 2

ILLINOIS GEOLOGICAL SURVEY

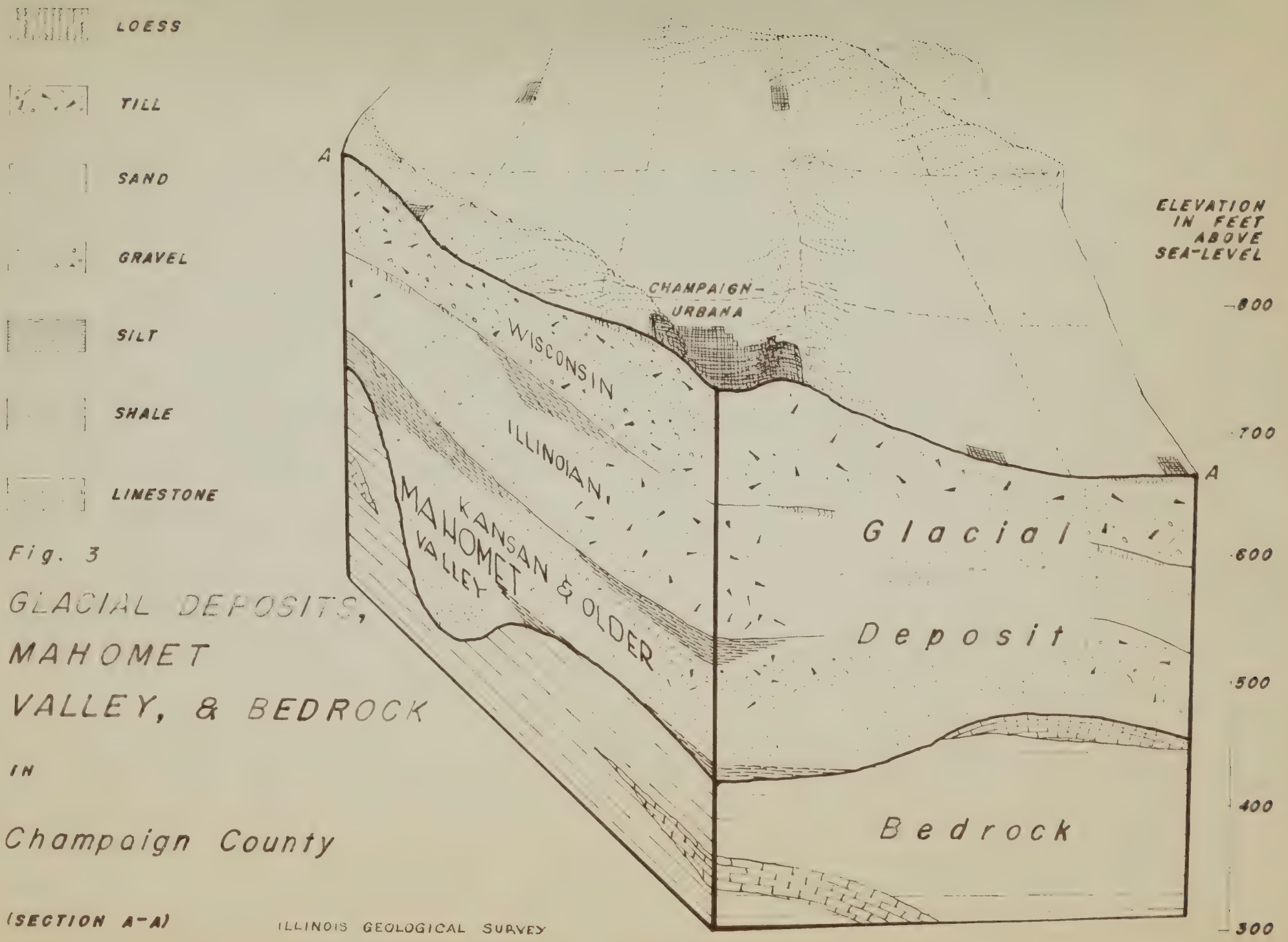


Fig. 3

GLACIAL DEPOSITS, MAHOMET VALLEY, & BEDROCK IN Champaign County

(SECTION A–A)

ILLINOIS GEOLOGICAL SURVEY

glacial deposits, until today, no trace of this deep valley remains on the surface.

The hard rocks which lie below the glacial deposits consist of layers of sandstone, limestone, dolomite, shale, and coal arranged one above the other like the pages in a book. They were originally deposited as sediments in coastal marshes and shallow seas that invaded Champaign County many times. The sandstone was deposited as sand, the limestone and dolomite by precipitation of carbonates and by accumulation of pieces of sea shells on the sea floor, and the coal was formed from plants which were buried in the coastal swamps.

The sedimentary layers were later hardened into rock, and then warped and tilted so that today they are no longer flat. Their positions are partly shown in figure 3.

Although in northern Illinois much of the drinking water comes from porus bedrock layers, in Champaign County the supply of usable water in the bedrock is too small to be useful. Instead our ground water is all pumped from the glacial deposits.

The largest and best single source of ground water in this county is the sand and gravel deposits, buried 200 feet or more below the surface in the valley of the ancient Mahomet River, mentioned above. Several towns (including Champaign-Urbana), a number of industries, and many farms rely upon wells that reach down into this source. Smaller ground water sources are other small deposits of sand and gravel often lying much closer to the surface than the Mahomet River Valley source.

The ground water is derived from seepage of a part of the moisture

that falls as rain or snow. Some of the moisture returns to the atmosphere by evaporation. Some of it is used by plants. Some of it runs off into streams. Only a very small fraction actually enters the ground water reservoir. This fraction percolates slowly into the ground to a level below which all openings in the sand, gravel, silt, or clay are filled with water. This level is called the water table. The water table rises or falls in response to the gain or loss of ground water in the reservoir. During extended dry periods, shallow wells go dry when the water table falls below the bottom of the well casing. The distance to water in a dug well that has not been recently pumped quite accurately shows the position of the water table. In the hilly parts of the county, at some distance from streams, the water table may be 50 feet below the earth's surface, while on the flatter areas, well away from streams, the water table may be more nearly 25 feet below the earth's surface. At the margins of streams and ditches the water table stands at stream surface level. It is the seepage of ground water into streams from along their banks which keeps them flowing between periods of precipitation.

Coarse materials, such as sand and gravel, take up, store, and yield water much better than fine materials such as clay and silt. Hundreds of wells located on farms over the county are only 50 feet deep or less. Most of these wells penetrate only into glacial till rather than into pure deposits of sand and gravel and are only a little deeper than the water table.

Studies have shown that much more ground water is available from seepage than is now being used in the county. This is true especially of the water stored in the sand and gravel layers. Thus, it can be said that

the available water supplies in many parts of the county and notably in the Mahomet region will support a considerable increase in use of ground water for the growing population of the county and for additional industry.

SURFACE WATER RESOURCES

By W. J. Roberts

Seventy years ago this part of Illinois consisted of poorly drained marshes and swampy streams. Dr. Albert W. Herre, world famous naturalist who lived here in the 1860's, remembers the area as a "prairie covered with water every spring." Only the higher ground was settled and cultivated at that time. However, when drain tiles were laid and drainage ditches and channel improvements were made, the flat fertile prairie areas were promptly put into cultivation. By the 1880's and 1890's, tile drainage became so widespread that most of the prairie land of central Illinois was quickly transformed into the rich farmland we see today. Practically all the areas that were formerly either prairie or marsh are now fertile farms. Drainage facilities have dried up the land surface and created orderly open ditch or tile drainage patterns throughout most of the county.

It is difficult for a stranger driving through the flat fertile land of Champaign County to realize that within its borders are the headwaters for four important Illinois rivers: the Sangamon, Kaskaskia, Embarrass, and Vermilion. These rivers drain the 1,000 square mile area of the county.

About one-quarter of the county is drained by the Sangamon River (Fig. 4), which enters Champaign County near the northwest corner north of Foosland and flows southeast to Dewey and then southwest past Mahomet.

Nearly one-fifth of the county is drained by the Kaskaskia River, which rises on the south slope of Yankee Ridge, northwest of Champaign, and flows southward out of the county near Parkville.

The northeast and east parts of the county, comprising almost one-half of the area, are drained by several branches of the Vermilion River, a tributary of the Wabash River. The Salt Fork flows southward from its origin near Ludlow

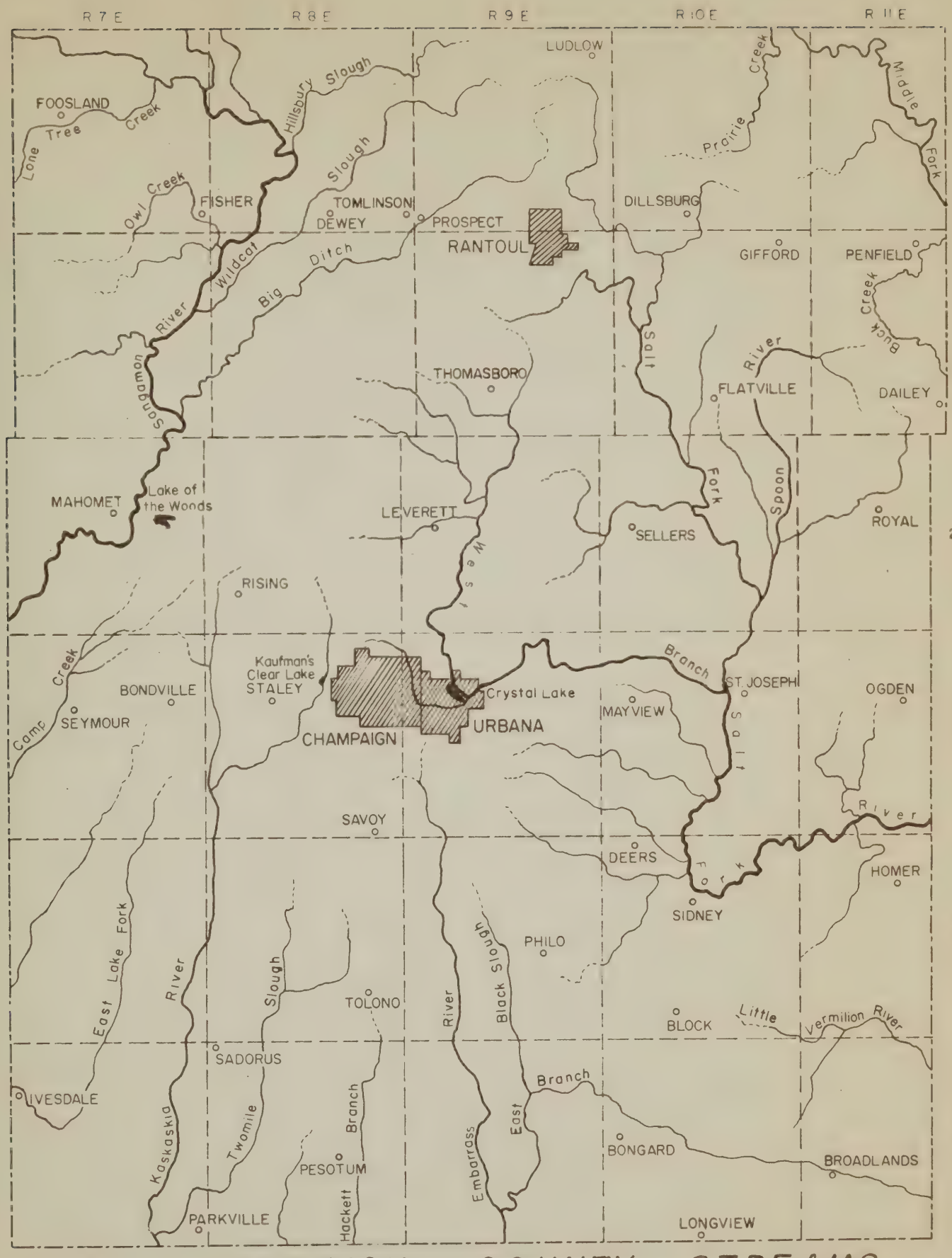


Fig. 4 CHAMPAIGN COUNTY STREAMS and Larger Recreation Lakes

ILLINOIS STATE WATER SURVEY

and drains all of the east central part of the county. The West Branch of the Salt Fork drains most of Champaign-Urbana by way of Boneyard Creek. The Middle Fork drains a small area in the northeast corner of the county.

Recreational Values of Streams*

The network of streams that transect Champaign County afford many miles of interesting, often beautiful, and sometimes wild recreational area. The extensive distribution of flowing waters in this county makes them readily available to residents of every community.

Besides providing interesting fishing for a variety of species such as channel catfish, suckers, bass, and sunfish, these flowing waters offer opportunities for boating, swimming, picnicking, and hiking. The best places for these activities are the Sangamon River, south from Fisher, the Salt Fork, south and then east from St. Joseph, and the Middle Fork, north of Penfield. Boating on these larger streams provides one of the best opportunities for observing the scenery and the animal life associated with a water course. But even the smaller streams and ditches have their assemblages of plants and animals in the water or along the banks that are attractive and even fascinating to people who enjoy the outdoors.

The principal threats to our streams are dredging and pollution. In the past, many miles of streams in the county have been spoiled for most recreational purposes by dredging for agricultural drainage. Some meandering streams have been replaced by straight ditches. One such stream may be seen in Crystal Lake Park. Although the polluting of streams is illegal, a number of streams in the county are still being injured by pollution. Sewage pollution from homes is becoming less and less common with the construction of more and more sewage

*The section on Recreational Values of Streams was prepared by Donald F. Hansen and R. Weldon Larimore.

treatment plants. However, many sanitary sewers from homes in Urbana and Champaign have been connected to city storm drains which empty into Boneyard Creek, and thence into the Salt Fork River near St. Joseph.

Recreational Lakes

Champaign County has at present three public recreation lakes -- Crystal Lake in Urbana, Lake-of-the-Woods and Elks Club Lake, in the Champaign County Forest Preserve near Mahomet.

About 1909-10 the course of the West Branch within Crystal Lake Park was changed by digging a new channel. A part of the abandoned channel, about 1/2 mile long, was widened and filled at the ends to make the present lake which covers about 7 acres. Crystal Lake is used for fishing and boating in summer and skating in winter. Within the park there are facilities also for swimming, dancing and other activities. For some years before 1909 the West Branch was dammed near Broadway and Park Streets and the resulting backwater flooded about the same ground as is occupied by the present lake. The location of this earlier body of water can be seen on the 1906 and 1909 Urbana quadrangle maps. Crystal Lake Park was started in 1907 by a donation of 15 acres of land from Judge J. O. Cunningham; the park now covers 90 acres.

Lake-of-the-Woods is located in Mahomet Township about 1½ miles northeast of the village of Mahomet. The area was made into a park by the Champaign County Forest Preserve District in 1948. The lake has an area of 38 acres. Originally the park contained 260 acres but several important additions have swelled the area to 331 acres of rolling terrain developed and maintained for public recreation -- picnicking, swimming, fishing, and golf. The original lake had a maximum depth of 20 feet. The dam has since been raised twice so that the water near the dam is now about 30 feet deep. The lake is fed by runoff from about 1 square mile of land and by several springs in the upstream area,

two of which are quite active. In addition, two deep wells provide fresh water for the swimming area and maintain the lake level during the summer high evaporation period.

Also located on Forest Preserve property is the 4-acre artificial impoundment acquired by purchase from the Champaign Elks Club.

Public need for recreation is reflected in attendance figures. At least 400,000 people visit Lake-of-the-Woods annually; about one-fourth of these use the swimming area. On a typical summer week-end, 10,000 people enter Crystal Lake Park.

Scattered throughout the county are smaller lakes and ponds. The small body of water on the Champaign Sportsmen's Club property is backwater from Lake-of-the-Woods. The Urbana Sportsmen's Club owns a small lake south of Mahomet near the Sangamon River. Paul's Lake and Spring Lake are two other small impoundments constructed near the Sangamon River at locations west of Mahomet. A water-filled sand and gravel quarry located west of Champaign has been made into a fishing area called Kaufmann's Clear Lake. There are also some farm ponds in the county and a few water filled borrow pits along the new express highway on the north edge of Champaign-Urbana.

Potential County Lakes

For over 20 years, area conservationists advocated construction of a large recreational lake northeast of Urbana near Brownfield Woods. In 1956 the State Department of Conservation made plans to build a 224-acre lake on this site. Although this has been considered the best large-lake site in the county from an engineering standpoint and was convenient to Urbana and Champaign, construction was vigorously opposed by property owners at a public meeting, and the state reluctantly abandoned the project.

The site northeast of Urbana would have cost over $1,000,000, but it may have been justified by the great number of people it would have served.

It has been suggested that a large lake could be created by damming the Sangamon River near Mahomet. Unfortunately, foundation conditions (for building a dam) discourage construction of a lake in this river valley. Further, because of the heavy silt load carried by the Sangamon River, a lake fed by this river would rapidly fill with mud and have a rather short life.

In addition to the two sites for large lakes there are perhaps 30 or more sites in the county for small lakes (the size of Lake-of-the-Woods or smaller). However, for various reasons none of these sites for small lakes can be considered to be very good. Most of them would have too large a proportion of their areas in shallow water and would require long expensive dams; many would be subject to rapid silting. The small lake sites having the fewest drawbacks are located in valleys tributary to the Sangamon River, northeast of Mahomet, while a little less desirable are several sites along the moraine northeast of Rantoul.

Keeping Tabs on Water Flow

During a year of normal precipitation, approximately 36 inches of rain falls on Champaign County. This water continues in motion and its destination is determined by a number of processes which include infiltration, evaporation, transpiration, underground travel and detention, percolation and overland flow or runoff. In an average year approximately 10 inches of this water enters our streams.

The amount of water leaving Champaign County is measured constantly at five stream gaging stations. Since 1888, the U. S. Geological Survey in cooperation with state agencies has been making these measurements as part of a national program.

These gaging stations can be recognized by the tall cylinders of galvanized corregated steel (they are about 4 feet in diameter) which stand at the stream edge -- usually near a bridge. Recording instruments are mounted inside these cylinders.

The gaging stations in this county are located at the following points: (a) at the Sangamon River bridge, Mahomet, on U. S. Highway 150, (b) on the Sangamon River 1/2 mile west of Monticello, (c) on the Kaskaskia River, 1 mile east of Bondville, (d) on Boneyard Creek (a tributary of the West Branch) on the University of Illinois campus.

These stream discharge measurements are necessary for the design and maintenance of drainage ditches and stream channels. They are used extensively for predicting flood stages downstream and for determining the volume of water available for water supply purposes such as municipal and industrial water systems and agricultural needs. In the case of one industrial water supply, National Petro-Chemical Corporation near Tuscola, the Kaskaskia River channel is used to convey ground water pumped near Bondville to a storage reservoir at the Tuscola plant.

The Right to Use Surface Water

The general public has hunting, fishing, and swimming rights on all navigable waters in Illinois since title (i.e. the legal ownership) to the beds of these water courses is in the state. They may not travel over private property without permission in order to reach these waters. Champaign County streams are not classed as navigable. Riparian owners may have title to the center of the stream or the whole of a lake if it is within their property.

At the risk of considerable over-simplification, the basic water laws applicable to surface water use may be summarized as follows: riparian owners -- those owning land adjacent to a lake, stream or drainage ditch -- may use the

water for domestic purposes and the watering of livestock. They may also impound and use all water that drains or falls on their property so long as the impoundment does not interfere with the drainage from other farms above. Artificial uses such as irrigation and manufacturing are restricted only to like reasonable use by all other riparian owners bordering the same water course.

The law is not clear regarding non-riparian use of water. At present landowners not living adjacent to a stream may not encroach upon the rights of riparian owners. The general welfare requires that our waters shall not be wasted or unreasonably used. Practically all Illinois water resources law has been developed through court decisions. It has been common practice for anyone to make unrestricted use of any available water resources. As greater demands are put on our water resources, water rights will become increasingly more important.

The 1945 Statutes refer to unlawful pollution of state streams. The State Sanitary Water Board has jurisdiction and control over pollution of all waters in the state and the Board has been assisted in its enforcement program by court orders.

Water Resources Research

A tremendous amount of factual data has been collected and published on the state's water resources. There is a great need for continuing this activity in order that we may better understand this valuable natural resource.

PRAIRIES

by Robert A. Evers

Prairie is a word which comes to us from the French language. In that language it means meadow. The word was used by early settlers as a general name for the large areas of grass, or the grasslands, of North America. It is an area in which native grasses are the dominant or most numerous plants. The prairie may grow on flat land, rolling land, sand, bottom land, hills, or very small openings within a forest.

The prairies of Champaign County would be classified as the flat land type because of the surface features of the county. When European man came to Illinois, prairie covered about 90 per cent of Champaign County. In other words, grassland blanketed the whole county except for some small groves of trees (as Brownfield Woods) and narrow belts of forest along streams.

Although the land surface now appears to be quite flat, (except on the moraines) much of it is actually marked by many shallow depressions. At the time of settlement, and continuing until field tile drainage was practiced, water stood in many of these depressions for several months during winter, spring, and early summer. The variations in dampness of the prairie soil resulted in different kinds of prairie plants growing in a patchwork over the land surface.

Try to imagine yourself looking at the prairie 100 years ago. The season is spring. You can see great distances. Perhaps the grassland has recently been burned and all the dried stalks from last year's growth have been destroyed. Now the grass is beginning to show, and green covers the landscape. As summer approaches, the grasses grow taller. You do not see as far because the tall grasses obstruct your

view. Among the grasses you see other plants; sunflowers, lead plant, and somewhat later the golden rods and asters. By the end of July the grasses are still taller, and by the end of August they have reached their greatest height, some of them much taller than a man. You can walk out into a patch of big bluestem and experience the sensation of being lost in a sea of grass. By the end of September the grasses have turned reddish-brown and plant life of the prairie is becoming dormant.

Where in Champaign County can we see true prairie today? Unfortunately, nowhere! The once vast prairie has been destroyed by man with the plow and drain tile. Now you see great fields of another American grass, maize or corn, of the Old World grasses, such as wheat, oats, or rye, and of an Asiatic legume, the soybean. You can, however, see some of the remnants of the prairie if you look closely along the fencerows or, better still, on railroad rights-of-way. When the railroads were built through Champaign County, not much of the prairie land had been destroyed. Generally soil was taken from the right-of-way to build up a road bed. Later prairie plants re-occupied the disturbed land. With the coming of the railroad, however, the grassland away from the trackway was soon put under cultivation.

So it is along the railroads that you can look for the plants that once adorned most of the county. Here you will find prairie cordgrass in wet places growing 11 feet high. Here you will find the big bluestem, the Indian grass, the switch grass, and the little bluestem. In the summer there will be numerous patches of colorful flowers; the purple cone flower, the yellow prairie cone flower, the tall compass plant with its sunflower-like blooms, the prairie dock with similar blooms on an almost leafless flowering stem but with huge rough, heart-

shaped basal leaves. The purple blazing stars are often seen in July, August, and early September. Frequently they cover sizable areas.

But many miles of prairie strips (on railroad rights-of-way) have been destroyed in recent years. In many places these strips have been plowed and planted to corn or soybeans. Often where this has occurred and the land, later on, has been left idle, European weeds, along with the white and yellow sweet clovers, rather than true prairie plants, have grown up on the bare land. In other places the prairie plants have been destroyed by chemical weed killers (which affect all the broadleaf plants) or they have been cleaned off by bulldozers. So, as the years pass by, we are losing more and more of our native prairie vegetation and having it replaced with foreign weeds.

It is regrettable that several large sections of flat land prairie were not set aside in Illinois in the same way virgin forests have been saved in a few places. Perhaps it will still be possible to save some of the prairie strips along the railroads if we act soon.

FORESTS AND FORESTRY

by J. Nelson Spaeth

This is a prairie county with features typical of "The Grand Prairie" of Illinois of which it is a part. Throughout the prairie areas of the Middle West, most of the woodland is found along the principal streams, either on bottomlands subject to flooding or on the upland at the headwaters of the major branches. So it is in Champaign County.

The Original Forest

When the first settlers came, there were great expanses of waving prairie grasses covering eleven-twelths of the land. Only 1 acre in 12 in the county was forest. The forest areas were concentrated along the Sangamon and Kaskaskia rivers and the Salt Fork and Middle Fork branches of the Vermilion River. At Mahomet and for at least 6 miles to the north, the belt of timber along the Sangamon was some 3 miles wide. North and east of Urbana the timberland along the Salt Fork was known as "The Big Woods." It extended from what is now Main Street in Urbana, north to the present town of Leverett, and east as far as Mayview. Brownfield and Trelease woods are remnants of this forest, most of which was cut long ago. In Brownfield Woods there are trees 3, 4, and even 5 feet in diameter and over 100 feet high. They give us an idea of the size of the original timber in the county.

Another belt of timber followed the Salt Fork from St. Joseph to Sidney and east to the county line. In the extreme northeast corner of the county, there was a belt of timber along the Middle Fork. Narrower strips of woodland flanked the Kaskaskia in the opposite corner of the county, and the Embarrass River to the south of Champaign-Urbana.

It is generally agreed that when the settlers came the forest was invading the prairie. Out from the edges of the woods tree seedlings were springing up in the grasslands, and slowly but surely the forest was taking more land as young trees shaded out the grasses and developed to form a dense forest.

The original forests of Champaign County contained only broad-leaved trees that lose their leaves in the wintertime. The most common kinds on the uplands, in order of importance to the settlers, were white oaks, red oaks, ash, black walnut, basswood or linden (also called linn), hickory, and hard maple. All of these trees were useful for building. Many had special uses. Black walnut was used for furniture because of the rich, dark color of the wood. Ash and hickory, because of their toughness, served for tool handles, homemade agricultural implements, and wagons. White oak, because of its resistance to decay, furnished shingles and fencing. Hard maple was particularly valuable because it supplied syrup and sugar as well as building material.

On the wet bottomland close to the streams, cottonwood, silver maple, elm, and honey locust were most common.

Forests and the Early Settlers

The availability of local supplies of timber had an important influence in the settlement of the prairie. Wood was needed for cabins for the settlers, and shelters for their livestock, for heating and for cooking, and for fencing. At first there were no railroads to bring in timber from other areas. There were no supplies of coal, fuel oil, or gas for heating and cooking. Wood was as necessary as food and water. In the early days prairie land could not be sold unless some woodland was included in the sale.

Although rich prairie land could be bought for $5.00 or less an acre, woodland, even if it were several miles away, cost six to eight times as much. The prairie land was usually sold by sections or half sections, but woodland in various parts of the county was divided into plots as small as 5 acres for sale to settlers on the prairie who had no wood.

Some of the first farmers on the prairie of Champaign County decided to create woodlots on their farms. They dug seedlings in the woods and took them home to plant. Others planted walnuts, hickory nuts, and acorns. This was the beginning of tree planting in our county. You can find many remnants of these plantings today on Champaign County farms. Black walnut from Champaign County plantations furnished gunstocks for both world wars.

In 1871 the University of Illinois started a forest plantation on the campus (along S. Lincoln Avenue, Urbana) to demonstrate to the farmers of Illinois the value of tree planting on the prairie. The trees included such native forest species as hickory, oak, and walnut, and a few species of evergreens like larch and white pine. For many years this area was called "The Forestry." It was one of the best known forest plantations in the Middle West. A large part of this plantation still stands.

Shelterbelts and Windbreaks

Rows of Osageorange (hedge tree) were once common on Champaign County farms. Sometimes known as shelterbelts, they served as fences and as barriers to protect crops and livestock from the sweep of the wind across the prairie. They also harbored wildlife. Now most farmers have pulled out their hedges because they were hard to maintain as fences, and crop plants often grew poorly in the vicinity of the hedge row.

A windbreak consists of rows of evergreen trees planted to protect a farmstead (buildings, yard, and feedlot) from winter winds. In most windbreaks the trees are planted to the north and west of the farm buildings. The trees are mostly Norway spruce and Douglas fir. Many windbreaks have been set out in the last 20 years in our county.

Today's Tree Planting

Land owners are still planting many thousands of trees in Champaign County each year. Most of these are evergreens, especially white, red, and jack pine, for Christmas trees. This is a rather new crop for the farms of our county, but one of increasing importance.

Our Present Forests

The forested area of our county has been reduced from nearly 50,000 acres to only 7,000 acres. Much of what is left does not look like the original forest. Timber cutting, grazing, and fire have taken their toll. The original forest was dense and dark. It contained trees of all sizes and ages and thickets of shrubs and annual plants. Many of the remaining woods are open underneath and contain only large trees because for many years cattle have been allowed to browse, pull up, or trample the small seedlings, saplings, and shrubs. Also, occasional fires have killed much of the young growth.

Most of the Champaign County land no longer in forests is being used for farming. However, not all of it is now being farmed. The entire town of Mahomet, and as indicated earlier, northeast Urbana, right up to the Court House square and along east Main Street, were once forest.

There are still several sawmills operating in the county where farmers can have their logs made into rough lumber for use on the farm. There is a continuous demand for fireplace wood. We no longer need to heat our houses with wood, but many modern homes have fireplaces because their owners enjoy the friendly glow of a log fire.

Many of the wooded areas that remain are more valuable for recreation, for home sites and cabin sites than for timber production. Girl Scouts and Boy Scouts seek wooded areas for their camps. Families like to picnic and hike in woodland parks and forest preserves. If we establish a park where there are no trees, we plant them and can hardly wait for them to mature. Earlier we mentioned "The Forestry" on the University campus. Some years ago its name was changed to "Illini Grove" and it was made a picnic area. The tables and fireplaces in this and in other outing areas in the county are in great demand throughout the spring, summer, and fall.

Preservation of Wooded Areas

The beauty and the solitude of natural woodland have recreative values which many people need and do not get from a park-like setting of grass and trees. Unfortunately the area of untrimmed and untamed woods within the county is diminishing. A strong effort should be made to set aside and protect "for all time" more of the wooded areas that still exist. When such tracts are acquired by parks and forest preserves, it should be possible to maintain a portion of them as wild areas, even when picnicking is carried on along their margins. Although most of the remaining woods are quite different in appearance from the original virgin forests, some, at least, can satisfy in a small way our primitive urge for the wilderness.

INSECTS

by Lewis J. Stannard

From the time the glaciers melted away in Illinois until European man arrived, a period of nearly 18,000 years, Champaign County was home to about 15,000 kinds of animals. By far the majority of these animals were insects, estimated to have been about 12,000 kinds. Insect species outnumbered the combined species of birds, reptiles, amphibians, mammals, fishes, worms, spiders, mites, and one-celled animals (Protozoa) by at least 4 to 1.

These many kinds of insects have played various important roles in plant and animal communities, both before and since the county was settled. Some tiny insects (beetles and gnat larvae) together with mites, fungi, and bacteria fed on fallen grasses, branches, leaves, and old roots and thereby helped convert the dead plants into humus. Minute ants, small bees, wasps, and beetles together with earthworms and rodents brought broken or decaying plant parts deep into their burrows, actions which resulted in the build-up and renewal of nutrients in the soil. Their numerous burrows helped aerate the soil. Eventually some of these tiny insects, mites, and worms were eaten by larger insects (ground beetles), which in turn were eaten by still larger animals (spiders, mice, snakes, etc.), so that the eater and the eaten formed a food chain that passed into the stomach of a still larger animal, for example, a meadowlark, a raccoon, or a bear. Meanwhile, the converted humus provided fertilizer for plants in the prairies and trees in the wooded groves. And as the herbs and the trees grew, they were visited by other insects to pollinate

the flowers which produced the seeds, while still other insects fed on these plants and seeds and helped prevent overproduction of vegetation.

The early settlers of Champaign County knew little about the value of insects or even that there were so many kinds here. These settlers had no microscopes with which to see the tiny insects, and the science of ecology was not yet well developed. Little wonder, then, that the only insects the settlers wrote about were those few that annoyed them or their domestic animals. For example, they mentioned the deer flies which bit cattle and horses and drove the stock out of the prairie meadows at midday in summer. They also wrote about a dreaded miasmatic disease which, for a period of 50 years, caused fever and death among the residents of the county. We have since learned that this disease was malaria and that the malaria-producing organism (a protozoan) was carried by an insect, an anopheline mosquito.

When the marshes were drained and the prairies plowed, the hordes of deer flies and mosquitoes were largely eliminated. But at the same time that these annoying and harmful insects were reduced in numbers, thousands of beneficial insects were destroyed. The original dynamic relationships between living things, sometimes called the "balance of nature" were radically changed. Most of the insect species native to the prairie retreated to fence rows and to the right-of-way along the highways and railroads where prairie plants remained. Many of the original homesites of insects were converted by man into corn, wheat, and soybean fields, or were covered by concrete roads, houses and other buildings.

Then trouble developed. Our native chinch bug, deprived of the native prairie grasses, moved into fields of wheat (an Old World grass introduced here by man) and from there moved into corn and destroyed much of both crops. The European Hessian fly, which came to America in the straw bedding of soldiers during the Revolutionary War, later settled in the wheat fields to wreak havoc. Native insects such as wireworms, June beetle grubs, and rootworms that had lived in the soil and fed on roots of prairie plants began feeding on corn, with the result that now, unless insecticides are used, the financial loss on a 40-acre field of corn may be as much as $200 a year. House flies from the Old World spread to every home and became a nuisance. Within the past 20 years, another European insect, the corn borer, has invaded our county, and in some years farmers have suffered great losses.

The fight to control native and foreign insect pests has been expensive both in time and money. We must protect our houses against termites, buy screens to keep out flies and mosquitoes, and insects that are attracted to lights at night; we spread chemical insecticides on our crops, and conduct research on control measures.

But on the other hand, the benefits received free from some insects are worth much more than we pay to control those few that are pests. Without charge, insects fertilize flowers to produce our fruits and vegetables. They, as do birds, destroy weeds and weed seeds. They prey upon one another and in so doing perhaps keep down the numbers of potential pests. They are food for game fish, birds, and mammals. Indeed, we may truly say that insects make it possible for many living things to exist.

We should make every effort to conserve insects that are valuable to us. When we set out to control insect pests we should make certain that the insecticides or methods used do not unnecessarily destroy beneficial insects. In controlling insect pests it is important that we follow the instructions given by entomologists and follow dosage rates given on labels. When used properly, insecticides are indispensable to farmers and gardeners, but when used indiscriminately, carelessly, or unnecessarily, insecticides can produce harmful effects not only to useful insects but to other wild creatures as well.

We should take care not to burn or otherwise disturb places where beneficial insects overwinter. Ladybird beetles that eat destructive plant lice often spend the winter under fallen leaves by bushes or in fence rows. Fence row vegetation and underbrush in woodlands should never be destroyed except for special, carefully determined reasons. Insects such as caddisflies, mayflies, and water beetles that are food for game fishes often can be increased in numbers by ending pollution. There is also reason to think that the number of stream insects might be increased by wider use of methods of farming that would reduce the amount of silt in our streams.

We should look on the majority of insects as assets to ourselves and to nature and let those that are not pests live to help us. We should include insects among those animals of the out-of-doors that are highly appreciated, for we can find much enjoyment in their songs, their colorful forms, and their interesting behavior.

FISHES, AMPHIBIANS, REPTILES, MAMMALS

by Philip W. Smith

Fishes

Approximately 80 kinds of fishes are known to occur in Champaign County. The important groups represented are the minnows with about 26 species, the suckers and buffalo fishes with 13, the sunfishes and bass with 13, the darters with 11, the catfishes and bullheads with 7, and nine other families with only one or two representatives in each. It is possible that there were a few other kinds present before the arrival of the first white settlers in the county, when there were many prairie marshes and clean, clear streams, but we have no evidence that any species of fishes have disappeared that were here originally. Several species have been introduced or have recently moved into the county so that the number of kinds we have at present may be even larger than the number present on the arrival of the white man.

The abundance of certain kinds of fishes has probably been greatly affected by operations which changed stream flow, the draining of marshes and the lowering of the water table by tiling farmland, and stream dredging. Some species may also have been affected by changes in turbidity, caused by farming and erosion. Pollution of several kinds has also probably affected some stream species. A survey made about 1900 showed that the spotted sucker and silvery minnow were rather common in the county; a similar survey made 30 years later showed that both kinds were much less common than formerly. It is reasonable to

believe that many other fishes are less abundant now because their original environments have been altered or destroyed; and it is, in fact, rather remarkable that we still have so many kinds of fishes in the county.

If judged by the 1900 and 1930 surveys mentioned above, civilization would seem to have favored some fishes. The creek chub, silverjaw minnow, and smallmouth bass were found to be more abundant in Champaign County in the later study. Many sport fishes are more common now than formerly because farm ponds and reservoirs have been built and sport fishes deliberately introduced. Smaller kinds of fishes were introduced when fishermen released their unused bait minnows in streams and lakes. The carp, goldfish, drum, red-ear sunfish, and yellow bass, which are familiar to most of us today, were apparently not in Champaign County before the arrival of the first settlers.

The steps that can be taken to preserve our fish fauna and to encourage an increase in number of some of our rarer species are conservation measures that have already been discussed in this handbook. We must guard against excessive erosion, pollution, and contamination of waters by insect sprays and weed killers. We must set aside areas in which ponds and lakes can be built and streams allowed to become as natural as possible. We must apply fisheries methods intelligently as they are recommended by specialists, and we must co-operate and educate others to co-operate with conservation officers and organizations interested in preserving our natural resources.

Amphibians

Twelve kinds of amphibians are known to live in Champaign County. Three of these are salamanders, two are toads, and seven are frogs. It is reasonably certain that the spotted salamander, marbled salamander, and red-backed salamander also were found in wooded areas in the eastern part of the county until recent times, and the spring peeper, a small type of tree frog, was probably present throughout the county before the woodlands were cut.

Three species, the wood frog, green frog, and tiger salamander, are very rare and will probably soon disappear from the county. Most of the amphibians in danger of becoming extinct were probably never very widespread in this area, because their habitat has never been extensive in this part of Illinois. The tiger salamander, however, is a prairie animal, and it was probably more common when there were still many ponds and marshes in Champaign County.

There is no direct evidence that any amphibians may be more abundant now than formerly, but the cricket frog, chorus frog, and leopard frog are so common that it is difficult to believe that they were ever more abundant, though they may have been. Furthermore, suitable habitat for these three frogs is still plentiful for they have adapted themselves to living in pastureland, other farmland, and along dredge ditches.

Except for the tiger salamander, which lives in wet prairie areas, the amphibians in greatest danger of extermination are woodland species. Therefore, the best measure to preserve our rare amphibians and to encourage their return to some areas is to set aside additional forest preserves and to protect the habitats of those still remaining from grazing, cutting, and burning.

Reptiles

Twenty-one kinds of reptiles have been found in Champaign County. Eight of these are turtles, 12 are snakes, and one, the glass snake, is a legless lizard. It is likely that the eastern hognosed snake, red-bellied snake, queen snake, and massasauga rattlesnake once occurred in the county, and it is definitely known that the lined snake was found here in the last century. Although it is possible that these snakes may be present somewhere in the county, it is more likely that they have been exterminated since their forest and prairie habitats have been so much disturbed.

Twelve kinds of reptiles are very rare, and some of them will probably soon be gone within our area. Those in greatest danger of extermination are the smooth green snake, blue racer, pilot black snake, prairie king snake, milk snake, Graham's water snake, and Blanding's turtle. Species such as the glass snake, musk turtle, eastern box turtle, map turtle, and red-eared turtle probably never have been common in Champaign County.

There is no direct evidence that any reptile is more abundant now than formerly, but it is not hard to believe that the plains garter snake and DeKay's snake may be present in greater numbers than formerly. Both species are now very abundant in vacant lots of cities and villages where there is an abundance of trash under which they can hide. Although many are killed on sight by man and many others are killed by automobiles when they crawl onto streets, very few are killed by their natural enemies such as wild mammals and birds. An important reason for the large numbers of these two snakes is the present abundance of the night

crawler, their principal food. The night crawler may provide a greater supply of food than was available before man introduced this large earthworm into Champaign County.

If we are to conserve the native reptiles--and we should, for most of them are beneficial and none is poisonous--we must protect the natural habitats remaining and try to develop similar areas. The green snake, Graham's water snake, and Blanding's turtle, all of which are characteristic of prairie marshes, can be encouraged by setting aside tracts of grassland and by discontinuing human persecution of these animals around lakes and ponds. The other snakes and the box turble, all of which are either forest or forest-edge species, can be encouraged by guarding the forest remaining in our county and increasing forest-edge habitat. This can be done by allowing hedge, brush, or grassland to grow along fences and roadsides. To save the harmless snakes and lizards, we must teach other people that these animals need not be feared and that some are actually useful because of their attacks on small destructive rodents.

Mammals

Thirty-nine kinds of wild mammals live in Champaign County at the present time. The groups represented and the number of kinds in each are as follows: opossum 1, shrews and moles 3, bats 8, carnivores or flesh-eaters (foxes, raccoons, weasels, and relatives) 9, rodents or gnawing animals (squirrels, rats, mice, gophers, and others) 17, and rabbits 1. According to a study made in 1910, there were actual records of the whitetail deer, bobcat, wolf, and starnosed mole having been seen by early residents of the county; and there is good reason to

believe that the bison or buffalo, bear, mountain lion, otter, and beaver also once lived here, although their presence did not happen to be mentioned by the early settlers. Three of our present-day species, the house mouse, Norway rat, and black rat, were accidentally introduced by man. The house mouse and Norway rat are now abundant. Two native species, the deer and beaver, have been re-introduced in recent years, but their status is still uncertain and they have not been included among the list of 39 species inhabiting Champaign County today.

Probably none of the kinds in the present list is in immediate danger of complete extermination in the county, although the badger, least weasel, gray fox, coyote, flying squirrel, chipmunk, jumping mouse, pine mouse, and bog lemming are rare. Continued destruction of natural habitats and outright killing of the gray fox, badger, and coyote will result in their eventual disappearance.

Several of our mammals appear to have changed their habits as civilization changed their habitats. For example, the opossum, a woodland species, now frequently lives in trash heaps and old buildings--many have moved into town; the raccoon which normally makes its home in a hollow tree will live in a box nailed to a tree, in stacks of baled hay, and very often in field tile. The redfox and the cottontail, both forest-edge mammals, and the prairie vole are other animals which no longer live only in their natural habitats.

The survival of some of the mammals has probably been favored by the gradual elimination of their natural enemies. In order to conserve our rare mammals, we must protect the remaining natural habitats and try to

develop new ones by setting aside similar areas. Of the nine kinds of mammals that are rare in Champaign County, some are woodland species and some are prairie species. Therefore, we must have both forest and grassland preserves. We must use the methods of management recommended by game specialists, and we must obey, and educate others to obey, our game protection laws.

Champaign County Birds

by Richard R. Graber

An accurate list of the birds of Champaign County would probably include 250 to 270 species, though only 40 to 45 of these are year-around residents. About 80 to 90 species are present in the county only during the migration seasons, moving to northern nesting grounds in spring and to southern wintering grounds in fall.

Approximately 115 species of birds nest in this area, and between 60 to 70 may spend the winter here, while 20 or more are of accidental occurrence.

Some of the larger groups of common birds are the herons (9 species), geese and ducks (21), hawks and hawklike birds (17), shore birds, gulls and terns (21), owls (7), woodpeckers (6), and the perching birds or "song" birds (130-140). Large families among the perching birds are the flycatchers (9), swallows (6), wrens (6), thrushes (7), vireos (7), warblers (36), blackbirds and orioles (11), and grosbeaks and sparrows (39).

Within historic times man has recorded the passing of several species of birds. Champaign County was within the range of the Carolina paroquet (once called the Illinois parrot) and the passenger pigeon, both now extinct. The wild turkey and greater prairie chicken, though not extinct, are no longer present in the county and are gone from a large part of their former ranges.

Still other species of birds have suffered reduction in numbers, partially as a result of man's activities. Hawks and owls, for instance, have been slaughtered without just reason and are still being persecuted to

this day, though they actually are now protected by law. This persecution has reduced the ranks of such species as the rough-legged hawk, the red--tailed hawk, and barred owl.

Within Champaign County in decades past it was common practice to sell birds of all kinds (even robins, meadowlarks, and mockingbirds) for meat in the market place. State and federal laws long ago put a stop to this practice to save wildlife and today most birds are protected.

A greater danger to certain species of birds than hunting has been man's destruction of suitable habitats, especially forest, prairie, and marsh.

Before the time of the first settlers, Champaign County was largely a prairie area, though it boasted nearly 50,000 acres of fine upland and lowland forest. The prairie land was dotted with thousands of acres of marshy lowland.

Today the prairie and marshes are almost completely gone, and the forest greatly reduced--all replaced by drained cultivated fields, and urban areas (cities and towns). The change has favored some species of birds. It has been detrimental to others.

The destruction of prairie with its scattered marshes has adversely affected the rails (king, Virginia, sora, and black rails), ducks, shore birds, the prairie-, and marsh-loving sparrows, (Henslow's, grasshopper, and Le Conte's sparrows), the marsh wrens, and probably the short-eared owl, and marsh hawk.

Destruction of most of the fine upland and bottomland forest of Champaign County through grazing and cutting has undoubtedly reduced numbers of such woodland nesting birds as the night herons, broad-winged, Cooper's

and other hawks, the barred owl, hairy woodpecker, red-headed woodpecker, whip-poor-will, Acadian flycatcher, scarlet tanager, white-eyed vireo, yellow-throated vireo, Carolina wren, white-breasted nuthatch, wood thrush, and the wood warblers-prothonotary warbler, Kentucky warbler, oven bird, redstart, and yellow-breasted chat.

Besides destroying habitats, man has created some. At least three species of prairie and marsh birds, the horned lark, dickcissel, and red--winged blackbird, have probably increased in numbers, having adapted to the cultivated hay fields which replaced the prairie.

A few species of birds have been introduced into the county, originally from foreign lands. Besides the ring-necked pheasant which was introduced for hunting, the rock dove (pigeon), starling, and house sparrow are non-native birds which have become common in recent times. House sparrows (English sparrows) probably reached Champaign County as early as 1870, but starlings were not present until the 1920's.

The rock dove, and more particularly the starling and house sparrow, associate closely with man and his dwellings. The starling and house sparrow have been a constant source of trouble and irritation to man and to such native birds as the purple martin and blue birds, which occupy man-made bird houses.

Ironically, the habitat changes wrought by man tend to favor the introduced species, and are generally detrimental to a variety of native birds.

In recent years new threats to bird life have appeared. Herbicides, such as 2, 4-D and 2, 4, 5-T, are used to kill roadside weeds and brush and small trees and thus to destroy a favored habitat of such birds as the song sparrow and goldfinch. It has been well established that DDT, dieldrin,

aldrin and other insecticide sprays can cause considerable mortality among birds in a sprayed area, but there are other far-reaching effects. For example, the destruction of vast numbers of insects by spraying removes an important food source for most species of birds. This is especially serious during the nesting season when quantities of insects are fed to nestling birds.

Herbicides and insecticides must be used with care.

The ultimate source of trouble for many of our native birds is the increasing human population. The destruction of prairie, marsh, and forest habitats are manifestations of the central problem of man over-running the land.

Many species of native birds will not tolerate man in close proximity, and for these species large tracts of relatively undisturbed prairie, marsh, and forest should be set up as preserves.

For those native birds that can live successfully close to man, we can provide encouragement in the form of suitable plantings of trees, shrubs, and herbaceous plants in yards and parks.

Almost any tree or shrub is better than none at all, but certain species of plants are exceptionally fine for attracting birds, because they provide cover for nesting and roosting, and food in the form of fruits, buds or seeds, besides the insects which may naturally be present on the plant. Plantings for birds should include some conifers such as pines, spruces, and especially junipers, the fruits of which are eaten by over 100 species of birds. Fruit trees such as the apples, cherries, mulberries, and service berries are fine for birds as well as man. This is true of other deciduous trees, the hackberries, maples, oaks, hawthorns, beeches, birches, gums

(tupelo and sweet gum), ashes, mountain ashes, the holly and oleaster, and many more.

Most shrubs should be planted en masse to provide maximum cover and food for birds. Among the best shrubs for birds are the viburnums (nannyberry, arrowwood, blackhaw, high bush cranberry), honeysuckles, elderberries, dogwoods, bay berry, blue berry, burning bush, choke berry, roses, blackberries, and sumacs. Vines, too, provide both cover and food for birds. Grapes, woodbine, Boston ivy, bittersweet, and brier are excellent.

Herbaceous plants are good food sources for birds, and pokeweed, sunflowers, ragweeds, buckwheat, smartweed, and the millets are favorites in this group. Trumpet vines, cardinal flowers and other brightly colored, tubular flowers are favorite feeding plants for the hummingbird.

For attracting birds to the door yard the importance of a constant water supply cannot be overemphasized. Feeding birds to attract them, even in winter, is of secondary importance to providing them with plants for cover. Because birds may become overly dependent on handouts winter feeding should not be undertaken at all, unless it can be continued throughout the cold season.

Many birds are easily attracted by food in winter. Sunflower seeds are sure to attract cardinals and bluejays, while millet and grain screenings are fine for attracting a variety of sparrows. Chunks of suet will attract starlings, woodpeckers, titmice, chickadees, nuthatches, and other birds.

In spite of the intensive cultivation of land in Champaign County, a variety of birds may be seen in the area. Good places to observe woodland species at any season, but especially during migration, are the wooded tracts along the several streams such as the Sangamon River (including the Lake-of-

the-Woods area), the Salt Fork; and the Kaskaskia. The tree-lined streets of city residential areas, parks, and cemeteries are also good places to look for birds. In Champaign-Urbana, Crystal Lake and Carle parks, and the wooded area opposite Woodlawn Cemetery (Busey Pasture) are excellent areas for bird study.

The open fields generally lack great variety of birds, but the barest fields support many horned larks the year round, and in winter great flocks of lapland longspurs occur in this habitat. Clover and hay fields are of interest to the bird watcher in summer because of their high populations of red-winged blackbirds, dickcissels, meadowlarks, and grasshopper sparrows. Bobolinks and Henslow's sparrows also occur in this habitat but are less common.

During migration seasons, particularly spring, shore birds abound in the wet bare fields. Golden plovers and pectoral sandpipers are especially numerous at such places. At this season, also, various species of ducks may be found on local farm ponds and at Lake-of-the-Woods.

LANDSCAPE

by Walter M. Keith, James S. Ayars, and Donald F. Hansen

Among the basic elements of landscape are land, stone, water, sky, vegetation, and man-made structures. Not all of these elements are in all landscapes. As the elements vary in amount and character, landscapes vary.

Time and climate act upon these elements to give variety to landscape from day to day, season to season, and year to year. Man, throughout his activities as farmer, builder, merchant, and manufacturer, makes great changes in landscape.

We think of landscape in two ways. First, we think of it as the general character of a large area or region. For example, we may describe Champaign County as a prairie landscape. Second, we think of landscape as the portion of land, sky, water, stone, vegetation, and structure that normally falls within our personal range of vision.

There is landscape in the city as well as in the open country. It is rarely as completely satisfying as rural landscape. Attempts are made to improve city landscape by the planting of native and foreign trees, shrubs, and flowers in parks, along streets, and around houses.

Elements of Landscape in Champaign County

Most of the land of Champaign County is flat or gently rolling. The broad stretch of flat prairie land gives a sense of freedom not felt in crowded cities nor in mountains.

The very flatness of the land makes possible broad views of farmland, of sunrises, sunsets, cloud formations, and of the far horizon. On fair days the sky appears as a vast blue dome. On dark and misty days it

seems to settle like a pall of smoke on the flat earth. For long periods in summer, and sometimes in spring and fall, white cumulous clouds, with their lower edges fitted to the flatness of the fields below, hang over the land. They, as well as the fields, are part of the landscape.

Stone is visible in the county only as a few boulders or gravel deposits left by retreating glaciers.

Water in the Champaign County landscape is in the form of streams or small rivers, many miles of drainage ditches, and a few small lakes. Most of the streams and rivers are sluggish and winding, except where they have been straightened by man. The drainage ditches, man-made, cut across the land in straight lines. Like the drainage ditches, all the lakes were made by man; the oldest of them are not more than 50 years old.

When European man first came to the Illinois country, the vegetation of the area that is now Champaign County consisted mostly of tall native grasses and tall native plants with showy flowers, all wild and untamed. Belts of trees edged the water courses; patches of trees covered some of the upland.

The vegetation today still consists mostly of grasses. But the grasses we see most are of civilized kinds: native corn, foreign wheat, oats, barley, rye, and pasture grasses, all tamed by man and all growing in large fields with square corners. Among the fields of grasses are fields of soybeans, clover, and alfalfa.

Still a very important feature of the landscape are the prairie plants on the railraod right-of-way. Except where these plants have been destroyed we still find the tall bluestem, Canada rye, and other grasses, and

we still have a continuous succession of color through spring and summer with the flowering of the purple aster, false indigo, prairie clover, prairie dock with its golden flowers, and the compass plant with its yellow flowers.

In some places in the county, especially along the larger streams, trees grow wild where they grew a century ago. They grow on the uplands in small patches as farm woodlots. But many of the trees now in the county grow where trees never grew before. Some have come up as volunteers in fence rows. Many have been planted by man to protect, and to improve the appearance of the structures that he has built on the flat prairie.

Of the man-made structures that are part of the landscape of Champaign County probably the most characteristic are the red corncrib and the concrete grain elevator. Other man-made structures in the county landscape are the railroads with their rights-of-way where some of the native prairie plants still persist; farm homesteads, each usually with a white house, tin-roofed red barn and crib, and a few trees; wire fences that stretch across the land in long, straight lines; highways, many of them broad, straight, and of concrete; steel and concrete bridges that span the sluggish streams; rows of grain storage bins, cylindrical in shape and made of corrugated steel; villages with a few houses and fewer stores that cluster about one or more grain elevators; and cities with subdivisions that sprawl over the black prairie earth.

Change and Variety in the Landscape

The story of change in the landscape of Champaign County is closely related to the history of land settlement and use by man. It is similar to

the history of man in other parts of the world. For a while after arriving in a new country, man spends most of his time in gathering material for shelter, food, and clothing. He then grazes animals and raises crops, at first for himself and his family and later for others for economic gain. With the desire for economic gain come improved transportation, industry, and settlements that grow into villages or cities.

Transportation, industry, and urbanization have now become powerful competitors for land use in Champaign County. They have become destroyers of rural landscape. The rural landscape of Champaign County should be considered as a resource worth saving from destruction.

Study of the fertile fields through a year shows a great variety of patterns. There is variety in the patterns made by the plow and the seeder.

Most of the fields are laid out with their borders in straight lines running east and west, north and south. Some fields are long and narrow. Some are square or nearly square. A recent English visitor was notably impressed with the simple layout of the fields, roads and cities.

Each field crop has its own color and texture. (Texture can be seen in fields of growing plants as well as in cloth.) The color and texture of a field crop seem to vary from hour to hour with changes in the direction and brightness of sunlight, and they vary from week to week as the crop grows and matures.

Trees in the landscape vary in form, color, and texture. The color and texture of trees vary with the time of day, with the changes in lights and shadows. Their colors change most with the changing seasons. The honey locust, the cottonwoods, the willows, ashes, maples, oaks, and hickories-- each

kind differs from all the others and each is beautiful in its own way.

Each kind of tree, has a characteristic form that is best seen in winter when the branches are bare of leaves. When trees grow close together, they are much less spreading than when they grow alone.

Trees lend variety to landscape not only by individual differences in form, color, and texture but by the sizes and shapes of their groupings. The color in a forest area may be stronger and more varied than that of a small clump of trees.

Along the edges of woods and along some roads and field borders grow shrubs or small trees-sumac, blackberry, gooseberry, New Jersey tea, hazelnut, crabapple, redbud, sassafras, pawpaw, hawthorn, and dogwood. Some of these add color to the spring with their showy blossoms and some add color to the autumn with their bright leaves and fruit.

Conservation of Landscape

Pleasant scenery is necessary for a well-balanced human existence. What can be done in Champaign County to preserve or improve the good features of the landscape and to get rid of the bad features?

The citizens of Champaign County should realize that desirable features of the landscape--the prairie strips along the railroads, timber stands and streams--are being threatened by the growth of cities, the expansion of highways, the building of superhighways, and other activities of man.

Everyone should become aware of the natural beauty of Champaign County landscape and think about its preservation.

They should become aware of the ugliness that exists in some places because of careless or unplanned land use. They should decide to get rid of some of this ugliness.

County zoning is a helpful tool in this process. It may assist in the control of unsightly and haphazard developments on the edges of cities and along highways. It may establish "entry districts" to improve the approaches to cities. It may regulate the location of junkyards and automobile graveyards, forcing their owners to place them behind screening devices or to locate them in industrial districts out of view of the motoring public. Zoning may regulate the number, location, and operation of city dumps. County zoning will help to stabilize land values.

But county zoning is not enough. Each individual citizen should assume responsibility for helping to keep the county free of litter. Anti-litter campaigns may be helpful in bringing this problem to the attention of the public. Conveniently located dumps that can be used by both city dwellers and farmers should be established in greater numbers than at present. Trash left along roadsides or streams should be removed, and laws should be passed to prevent further dumping in such places.

The citizens of Champaign County should be sure that the location of new highways does not needlessly destroy valuable woodland or other areas of unusual beauty. Scars on the earth left by bulldozers in the course of highway construction should be healed by plantings of grass or other vegetation after necessary grading has been done. Wayside parks constructed along main travelways should be made attractive and kept clean.

Citizens should encourage the development of parks or other open spaces in both country and city. County governmental agencies can acquire

and develop woodlands, wildlife refuges, and large recreation areas. City governments can acquire and develop parks that add beauty to the urban landscape and provide recreation for large numbers of persons.

Hiking and riding trails can be constructed in forest areas, along streams or in other recreational areas. Boating courses can be laid out on streams. Small lakes and ponds can be constructed to provide recreation and add beauty to the landscape. Automobile routes through scenic parts of the county can be laid out and marked. These routes can include stream and woodland views and wide vistas of prairie land as seen from high points on moraines.

New park areas should be added with new real estate developments. Existing parks should not be converted to other uses unless they are no longer needed as parks. They should be kept in good condition and not allowed to assume a run-down or dismal appearance.

In large parks or forest preserves, certain areas should be allowed to grow wild.

Directing landscape and park developments in the county should be persons who have respect for the native landscape, an interest in preserving it, and a knowledge of landscaping principles.

In the past hundred years, the character of the landscape of Champaign County has changed greatly. In the years to come, the character of the landscape will continue to change. The changes that are made should be guided not by accident, but by thoughtful planning.

UNIVERSITY OF ILLINOIS – URBANA
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